

**CONSUMER PERCEPTION OF TAKE-OUT FOOD:  
SAFE HANDLING PRACTICES AND DESIRED PACKAGE ATTRIBUTES**

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**ABSTRACT**

This study was conducted via an online survey service to determine how the public perceived take-out food, food packaging, and general food safety issues. The survey covered topics ranging from sanitation practices to how food is treated once purchased from a given establishment. Despite research suggesting a general lack of consumer food safety knowledge, results from this 324-person sample indicated familiarity with proper sanitation, high-risk foods and associated pathogens. When asked about desirable packaging attributes, participant responses were mostly concerned with purchasing food in a container that would be leak-proof, and that would keep the food at the appropriate temperature.

**KEY WORDS:** Consumer perception, take-out food, food safety, food packaging.

## INTRODUCTION

As consumer purchases of food away from home increases annually, with it arise several concerns as to the public's knowledge of safe food handling behavior. The increase in take-out food is accompanied by the increasing risk of foodborne illness (Binkley & Ghiselli, 2005). In spite of proper sanitary practices by foodservice personnel, once packaged food has left the establishment, consumers must rely on their own food safety knowledge and the integrity of the packaging to prevent consuming a contaminated product. This evolution of take-out food has trended towards curbside service since 2001. Convenience curbside take-out products are now responsible for up to ten percent of total sales for some establishments (Swartz, 2004). Over the last three years, curbside take-out has doubled the annual take-out sales of chain concepts such as Outback Steakhouse, Applebee's and Chili's (Warner, 2006). This increase in sales indicates a huge amount of profit for the chains when one considers that 57% of the American population orders take-out food at least once per week (Klara, 2004). Such profits represent a 58% increase over a ten-year period in 2002; up \$152 billion from 1992 figures (Stewart, Blisard, Bhuyan, & Nayga, 2004). In essence, "restaurants have become places to [purchase] food to eat somewhere else" (Food Institute Report, 2007, p.1). While such convenience seems irresistible to consumers, widespread purchase of take-out food raises several problematic factors: the amount of time from purchase to consumption, the type of container being used, and the consumer knowledge as to reheating food products safely.

Because of the growing demand for take-out foods, foodservice establishments have no choice but to react (Foodservice & Packaging Institute, Inc., 2007). The challenge however is to find containers that keep the food hot, and are cost effective (Matsumoto, 2000). Containers used by traditional quick service restaurants (QSRs) hold foods that are frequently consumed in the car or the parking lot, while curbside to go concepts need packaging that will keep the food quality intact until the consumer arrives home (Swartz, 2004). Before Applebee's began its curbside service, the company conducted focus groups to determine what the consumer wanted from take-out packaging. What was discovered was that the chain's existing white polystyrene clamshell containers did not keep food hot, tended to leak, and were damaged easily with sharp utensils (Sheridan, 2003). The current containers, heavy plastic bases with clear, sealable lids, cost the company far more than did the competitively priced clamshells, but they are also functioning on several levels: as a means to support the integrity of the product, as a marketing tool, and to reproduce the upscale nature of the restaurant's table settings in the consumer's home (Shea, 2004).

Chain QSRs and full-service restaurants are showing great potential for increased usage of foodservice disposable packaging over the next five years, with an estimated annual increase of 5 percent, as opposed to typical growth of 1 or 2 percent (Falkman, 2002). Thirty-eight percent of restaurant owners polled anticipated that take-out sales would contribute more to total sales in 2007. In addition, 37 percent of consumers polled have used curbside services in restaurants previously considered "sit-down" establishments (National Restaurant Association, 2007).

Only take-out and curbside services are fueling the increased sales in the foodservice market since consumer interest for dining in restaurants is not growing. The value to the current consumer is the ability to purchase already prepared food, and take it

away to consume at home (Prewitt, 2002). This market is supported by single working people, and dual-income couples, both with or without children, who are purchasing take-out food five times per week due to time constraints (Binkley & Ghiselli, 2005). Subsequently, the QSRs have taken over 50% of the food away from home market (Allen, 1999).

With increased consumption of take-out food, come increased risks to the consumer associated with a general lack of food safety knowledge and practices (Milliorn, 2001). Although the federal government regulates the manufacture of single use packaging items with regard to health issues and environmental safety concerns, there are no governmental regulations on the packaging or labeling of take-out food (Foodservice & Packaging Institute, Inc., 2007). All food safety standards are self-regulated, leaving the responsibility to the restaurant operators to ensure the safety of products and services they provide (Binkley & Ghiselli, 2005). Most take-out containers and packaging materials do not contain any handling or reheating instructions. A 2002 survey of 1011 men and women over 20 years of age, by the American Dietetic Association (ADA), revealed that 75% of survey participants would appreciate safe handling instructions on take-out labels (Klara, 2004). In addition, the survey indicated that 51% of Americans do not know the proper temperature for reheating leftovers, and that 48% rely solely on their senses to determine if a food product is spoiled (Klara, 2004). Other research suggests that consumers do not understand how long leftovers may be safely stored (Terpstra, Steenbekkers, de Maertelaere & Nijhuies, 2005). Three reported cases of *Clostridium botulinum* reported in 2007 were associated with incidents in which packaged foods were not cooled and stored properly (Lando & Fein, 2007). This lack of safety knowledge represents a serious problem, especially when considering the growing number of consumers purchasing take-out food.

Because of the growing popularity of take-out food and the public's lack of food safety knowledge, a significant increased risk for widespread foodborne illness is likely. The purpose of this study was to determine the level of public awareness of food safety issues associated with food prepared away from home, as well as public perception of positive and negative attributes of take-out food containers and packaging. Specifically, this study was conducted to support the following research questions: (1) Are consumers who purchase take-out foods knowledgeable about food safety topics? (2) Do consumers feel that restaurants are responsible for the safety of their customers? (3) Do consumers purchase take-out foods based on perceived qualities of take-out containers? (4) What are qualities impacting purchase decisions?

## **METHODOLOGY**

This study utilized an online survey engine (source: [www.surveymonkey.com/take-out%20food](http://www.surveymonkey.com/take-out%20food)) to obtain the sample, host the survey, and gather data. The survey method was chosen to elicit responses directly from a large sample of consumers who purchase take-out food on a regular basis. To expedite dissemination, a link to the survey was posted on an online university daily announcement system that is available to all staff, faculty and employees.

Snowball sampling was chosen for this study due to its popularity in current research on consumer perceptions (Banister, 2003). This method is very cost effective when compared to a mailed paper survey, and can result in a large number of participants

(Sukalakamala, 2007). The technique utilizes a web-based survey engine, and encourages participants to forward the survey on to other internet-users (Kelly, Clark, Brown & Sitzia, 2003). In addition, five hundred cards printed with the URL of the survey were placed in the to-go containers of selected restaurants representing high volume fast food, quick service restaurants with pick up counters, and casual dining featuring curbside service.

Configuration of the instrument was based on a survey designed to measure elements impacting purchasing decisions by consumers visiting wineries (Kolyesnikova, 2006). The pilot-tested instrument consisted of twenty-six questions including screening questions and demographics. The instrument was designed to measure four constructs: consumer food safety knowledge, elements impacting purchase decisions, responsibilities of the restaurant, and perception of packaging qualities. Approval from the University's Internal Review Board was obtained prior to the study for research using human subjects.

In the first portion of the survey, participants were asked to respond to nine statements on a five-point Likert scale; response choices ranged from 1 (totally agree) to 5 (totally disagree). The questions were designed to elicit the most important aspects driving the consumer's decision to purchase take-out food, as well as to understand the level of food safety knowledge of the average consumer.

Following these statements were a series of nine multiple choice questions designed to gauge consumer knowledge of food safety, safe food handling practices, and take-out purchasing behavior. The third portion of the survey consisted of four questions designed to examine consumers' perceptions of desired attributes in take-out packaging, as well as safe food handling practices. The survey ended with seven demographic questions. The survey was administered between January and March of 2007, and was made available on surveymonkey.com.

## **RESULTS**

Of the 324 surveys received, 310 were used in the analysis. Fourteen surveys were unusable for data analysis because the participants failed to complete all portions of the survey. Eighty-six percent of the sample reported purchasing take-out food at least once per week, and for an average monthly purchase of 7.09 times. This behavior resulted in an average of \$80.04 spent on take-out food per month, per person. The mean age of respondents was 45.30 years, most were female (80.4%), white (87.5%), married (63.9%), and self-rated their food safety knowledge level as at least fair (50.5%). The sample reflected a wide educational level from high school diploma to graduate degree., with the majority holding a graduate degree (Table 1).

For analyzing reliability of measurement, a Cronbach's alpha value of .69 was obtained. To measure construct validity, the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (MSA), and the Bartlett Test of Sphericity were used to determine the appropriateness of applying factor analysis to consumer knowledge. The value of MSA was .69, which was a reasonable value (Kaiser, 1974), and verified that the use of factor analysis was appropriate in the study. Bartlett's Test of Sphericity value ( $\chi^2$ ) was 820.043, (df = 45,  $p < .001$ ), and showed that the data used in this study did not produce an identity matrix and thus were multivariate normal and acceptable for factor analysis.

Factor analysis with a Varimax rotation procedure was employed to identify underlying dimensions of consumer perception of food safety. Four factors, with eigenvalues greater than 1.0 and accounting for 65.6% of the total variance were retained.

Table 1. Demographic Characteristics of Respondents (n=324)

Gender	%	Marital Status	%
Female	80.4	Married	63.9
Male	19.6	Single	23.6
		Divorced	9.5
		Widowed	3.0
Educational Level		Ethnicity	
High School Diploma	5.1	White, Non-Hispanic	87.5
Vocational/Technical School	1.4	Hispanic	5.8
Some College	15.9	African-American	0.7
Undergraduate Degree	20.0	Asian	3.7
Some Graduate Work	11.2	Other	2.4
Graduate Degree	44.7		
Other	1.7		

All attributes with factor loadings of 0.49 or greater were kept in the analysis. The constructs identified were titled “consumer food safety knowledge,” “elements impacting purchase decision,” “responsibility of a restaurant,” and “perception of packaging qualities” (Table 2).

Participants were fairly knowledgeable about food safety issues, based on responses about potentially hazardous foods and associated pathogens. However, they tended to underrate their level of this knowledge ( $M = 2.01$  on a five point scale). Participants were also very concerned about packaging qualities and food safety information being provided by the restaurant ( $M = 2.33$ ). While participants gave lower responses on some take-out packaging attributes, such as the container’s ability to be recycled ( $M = 2.15$ ), the participants were very concerned with purchasing food in a container that would be leak-proof (95.3%), and that would keep the food hot/cold (91.9%) (open-ended).

Very little difference in elements impacting purchase decisions between the various demographics was noted. However, there was statistical significance between genders regarding the importance of packaging for take-out food. Males were more likely to consider packaging an important aspect of the purchase decision as compared to females ( $t = -3.01, p < .05$ ).

Table 2. Factors, Variables, and Associated Values

Factor and Variables	Factor loading	Eigen Value	Reliability Coefficient	Communality
<b>Consumer food safety knowledge</b>		2.681	0.909	
I feel I understand how to properly handle leftover food.	0.938			0.375
I feel I understand what causes a food borne illness and prevent it from happening in my home.	0.927			0.563
I feel I am very knowledgeable in food safety.	0.882			0.533
<b>Elements impacting purchase decision</b>		1.641	0.504	
When I purchase take-out food, I return home with the food as soon as possible.	0.808			0.738
When I purchase take-out food, the restaurant is very important in the decision process.	0.491			0.621
<b>Responsibility of a restaurant</b>		1.178	0.351	
I feel restaurants should provide take-out containers that are recyclable.	0.837			0.521
I feel the restaurant is responsible to provide food safety information concerning take-out food.	0.66			0.792
<b>Perception of packaging qualities</b>		1.063	0.266	
When I purchase take-out food, the location of the restaurant plays a big part in choosing that restaurant.	0.743			0.886
When purchasing take-out food, the packaging is an important consideration.	0.7			0.866

*Consumer Food Safety Knowledge*

Analysis of Likert-rated questions revealed that 85.4% of respondents either totally agreed or agreed that they understood how to properly handle leftover food (M = 1.93, SD = 0.79). Eighty-two percent either totally agreed or agreed that they understood what caused a foodborne illness, and how to prevent this in the home (M = 1.96, SD = 0.85). In addition, 72.6% either totally agreed or agreed that they were knowledgeable about food safety (M = 2.14, SD = 0.86).

*Elements Impacting Purchase*

Eighty-six percent of respondents either totally agreed or agreed that they returned home with take-out food as quickly as possible (M = 1.65, SD = 0.85), and 93.7% of respondents either totally agreed or agreed with the statement that the restaurant (i.e., brand loyalty) was important in the decision process (M = 1.55, SD = 0.64).

*Responsibility of a Restaurant*

Sixty-four percent of respondents either agreed or were neutral about the statement that restaurants should be responsible for supplying food safety information (M

= 2.33, SD = 1.03), and 35% were neutral about whether or not the packaging was recyclable (M = 2.15, SD = 0.87).

*Perception of Packaging Qualities*

Forty-three percent of respondents were neutral concerning packaging being an important factor impacting purchase decision (M = 2.79, SD = 0.88), while 90.2% totally agreed or agreed that the location of the restaurant is a major part of the decision process (M = 1.75, SD = 0.71). These respondents were less concerned with brand loyalty as with distance from restaurant to home, and necessary packaging attributes (Table 3).

Table 3. Factors, Statements, and Associated Means and Standard Deviations

Factors and Statements	Mean <sup>a</sup>	SD
Consumer food safety knowledge		
I feel I understand how to properly handle leftover food.	1.93	0.79
I feel I understand what causes a foodborne illness and prevent it from happening in my home.	1.96	0.85
I feel I am very knowledgeable in food safety.	2.14	0.86
Elements impacting purchase		
When I purchase take-out food, I return home with the food as soon as possible.	1.65	0.85
When I purchase take-out food, the restaurant is very important in the decision process.	1.55	0.64
Responsibility of a restaurant		
I feel restaurants should provide take-out containers that are recyclable.	2.15	0.87
I feel the restaurant is responsible to provide food safety information concerning take-out food.	2.33	1.03
Perception of packaging qualities		
When I purchase take-out food, the location of the restaurant plays a big part in choosing that restaurant.	1.75	0.71
When purchasing take-out food, the packaging is an important consideration.	2.79	0.88

(<sup>a</sup> = On a scale of 1= Totally agree; 5 = Totally disagree)

When asked about the proper temperature for a consumer refrigerator, 68.1% chose the correct response. However, when asked about types of food that would likely cause a foodborne illness, only 32.9% chose the correct response. Nearly 98% of respondents knew that if a food should not be eaten it will not always smell bad. Eighty-five percent associated *Salmonella* sp. with raw poultry, but only 40.5% of respondents knew the proper hand washing technique requires hands being rubbed together for at least 20 seconds. Respondents were asked how many times per day they washed their hands; 56.2% reported washing them 0-10 times, 32.3% reported washing them 11-15 times, 7.1% reported washing them 16-20 times, and 4.4% reported washing their hands over 20 times per day.

When asked about the proper way to thaw ground beef, 95% of respondents knew that it should be done in the refrigerator, but only 32.2% knew that reheating leftovers required an internal temperature of at least 165 degrees F. Eighty percent of respondents felt that food could only remain un-refrigerated for one hour; only 3.7% chose the correct response (4 hours). Likewise, 52% of respondents felt that leftover food was only edible within 2 days, while only 2.7% chose the correct response (a weeks' time).

Four additional questions relating to take-out food and packaging were asked at the end of the survey. First, respondents were asked about desired packaging characteristics. The most widely chosen characteristics were: leak-proof (95.3%), keep the food hot/cold (91.9%), keep the food from becoming soggy (84%), packaging with compartments to separate food items (74.2%), microwaveable (55%), recyclable (51.3%), and finally, oven-safe (13.8%).

The second question addressed the type of packaging that was used when foods were purchased. The most frequently used packaging types were: foamed polystyrene containers (91%), corrugated paperboard containers (pizza boxes) (85.2%), aluminum foil wrappers (54%), plastic microwaveable containers (44.0%), non-microwaveable plastic containers (41%), and aluminum containers (37.9%).

The third question asked respondents what they did with leftover take-out food. Sixty-seven percent said they left the food in its original container and refrigerated it. Fifty-three percent said they transferred the food to another container and refrigerated it. Thirty-five percent of respondents said they disposed of any leftover take-out food. Point seven percent said they left it in the original container and did not refrigerate it. No respondents said they transferred the food to another container and did not refrigerate it.

The fourth question addressed the type of food safety information that was supplied to respondents when they purchased take-out food. The majority of respondents reported having no information supplied by the restaurant, 22.5% reported receiving information regarding reheating instructions, 14.4% said they received cooking instructions, 4.7% received information on how to store the food or leftovers, 2.3% received information concerning how long to keep the product in the refrigerator, and only 1.0% received information on amount of time food should be un-refrigerated.

## CONCLUSION

Most respondents were knowledgeable about the majority of the food safety questions; meaning they were familiar with food safety issues, as well as some of the more advanced topics dealing with *Salmonella* sp., and the foods associated with other foodborne pathogens. However, one important result was how close the response percentages were for safe internal temperature for re-heated leftovers (145 degrees F at 31.6% vs. the correct response: 165 degrees F at 32.2%). Due to the fact that such misinformation could lead to consumption of contaminated food, this high percentage could be a red flag among missed items. For the most part, respondents erred on the side of caution. For example, most said they would refrigerate uneaten food within an hour, when according to food safety guidelines food can be left un-refrigerated for up to four hours. Likewise, when asked how long leftover food remains viable, over half of respondents said “within two days.” Guidelines state that if properly refrigerated, leftovers are viable for a full week. Though these are technically “wrong” responses to food safety questions, this lack of knowledge would probably not correlate with foodborne illness.

Clearly, some consumers purchased take-out food based upon perceptions about take-out packaging. However, respondents concerned with the packaging used were primarily interested in container attributes that facilitated prompt consumption such as thermal integrity; resistance to leakage; retention of product crispness; and compartmentalization of product. This variable is consistent with the Likert-rated questionnaire item that suggests most respondents purchased take-out food for the purpose of returning home with the food and consuming it immediately.

Consumer perception indicated the majority of respondents felt that restaurants had a responsibility to provide safe handling instructions; however, nearly eighty-two percent of respondents claimed that no information whatsoever was provided with purchased take-out products. Due to the fact that safe handling practices are strictly up to the consumer once the package has left the establishment, restaurants would be wise to provide such information (Foodservice & Packaging Institute, Inc., 2007).

According to respondents, individual experiences at specific restaurants played a major part in the purchasing decision process. The majority of the respondents agreed or strongly agreed that the restaurant was a major deciding factor in their decision to purchase take-out food, and that they remained loyal to specific establishments. In addition, another major factor in the decision making process was the location of the restaurant, where a majority of respondents said this was a major factor fueling their purchase. The closer the restaurant was located to the respondents' homes, the less concerned the respondents were about packaging qualities. Future studies of consumer perception of take-out packaging, as well as consumer food safety knowledge, could be strengthened by conducting this experiment on another sample. In addition, random sampling and paper/pencil surveys could strengthen the method. Finally, the long interview method could be utilized targeting a specific market segment.

Limitations of this study included narrow demographic parameters for age, gender, race, education and income level; which prevented this study from being generalized to the population as a whole. In addition, internet hosted surveys do not allow the researchers to accurately measure response rate, nor were the researchers able to

determine exactly how the respondents were exposed to the survey: i.e., the university website, the restaurant cards or word of mouth.

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